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Docket No.: S9025.0059
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Christian J. Lee et al.

Application No.: 10/617,495

Filed: July 11, 2003

Art Unit: 1752

For: SELF-DAMPENING INK COMPOSITION AND METHOD FOR LITHOGRAPHIC PRINTING USING THE SAME

Examiner: H. V. Le

APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Notice of Non-Compliant Appeal Brief mailed October 24, 2006, the balance of this paper is a Brief revised to address said Notice.

As required under § 41.37(a), this brief is filed in furtherance of the Notice of Appeal filed in this case on June 16, 2006.

The fees required under § 41.20(b)(2) have already been paid.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1206:

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

Sun Chemical B.V.

II. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS

The only other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal is the appeal in co-pending application Serial No. 10/117,910, which is the parent to this case.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 18 claims pending in application.

B. Current Status of Claims

1. Claims canceled: 0

2. Claims withdrawn from consideration but not canceled: 0

3. Claims pending: 1-18

4. Claims allowed: 0

5. Claims rejected: 1-18

C. Claims On Appeal

The claims on appeal are claims 1-18.

IV. STATUS OF AMENDMENTS

Applicant did not amend the claims after Final Rejection.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Lithography is a printing process that relies on the chemical distinction between image and non-image areas on a printing plate rather than a physical relief differentiation. The image areas are hydrophobic and oleophilic in order to be receptive to inks, while the non-image areas are hydrophilic and water receptive. In a typical printing process, the surface of the lithographic plates is contacted with dampening rollers to apply a dampening solution, such as water or an aqueous fountain solution, prior to contacting the plates with an ink-containing solution. The dampening solution spreads on the non-image area of the lithographic plate, but is unable to form a continuous layer on the image area of the plate. When subsequently contacted with an ink-containing solution, the aqueous layer on the non-image area of the plate inhibits the surface from accepting the ink, while the image areas remain free

to accept the ink. Despite any differences in the hydrophobic/oleophilic nature of the image and non-image areas, the ink-containing solution typically will wet both the image and non-image areas in the absence of dampening solution.

The use of a single fluid lithographic ink, e.g., an emulsion of lithographic inks in water, in lithographic printing processes is desirable but difficult to realize. In order to be useful, a single fluid lithographic ink must be formulated so that the hydrophilic phase separates from the ink to maintain clean non-image areas regardless of the degree of ink coverage area, while at the same time the emulsion ink has sufficient stability to prevent the two phases from separating at any time prior to reaching the printing plate. Achieving this stability balance is complicated.

The invention is based on the discovery that a ink composition comprising: (a) glycerol; (b) a nonionic surfactant having a hydrophilic/lipophilic balance of about 8 to about 20; and (c) water in an amount of about 20 to about 50 percent by weight based on the total weight of the composition, could be used as a self-dampening single fluid lithographic ink. This application claims the method while the parent case, also on appeal, claims the composition.

One mapping of the sole independent claim, claim 1, is as follows:

The method for lithographic printing [0011] comprises using a self-dampening lithographic ink composition [0011] comprising a glycerol [0011]; a nonionic surfactant having a hydrophilic/lipophilic balance of about 8 to about 20 [0011]; and about 20 to about 50% by weight based on the total weight of the printing ink composition of water [0011].

A series of dependent claims, claims 6-9 and 11, have been separately rejected. To the extent those claims include recitations beyond that in claim 1, one mapping would additionally reference paragraphs [0022] and [0023].

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-5, 10 and 12-18 were rejected under 35 U.S.C. § 102 over Krishnan (US 5,725,646).

Claims 6-9 and 11 under 35 U.S.C. § 103 over Krishnan in view of Best (EP 0 079 764) and Wasilewski (US 5,372,635).

Claims 6-9 and 11 under 35 U.S.C. § 103 over Krishnan in view of Wasilewski.

VII. ARGUMENT

The lithography printing process is based on exploiting the difference between hydrophobic/oleophilic ink accepting image areas and hydrophilic/water receptive non-image areas. Typically, the surface of the lithographic plates is contacted with dampening rollers to transfer a dampening solution, such as water or an aqueous fountain solution, to the plate surface. The dampening solution spreads on the non-image area of the lithographic plate, but is unable to form a continuous layer on the image area of the plate. When the plates are subsequently contacted with an ink-containing solution, the aqueous layer on the non-image area of the plate inhibits the surface from accepting the ink, while the image areas remain free to accept the ink. The damping composition is necessary because despite the differences in the hydrophobic/hydrophilic nature of the plate's image and non-image areas, the ink-containing solution typically will wet both areas in its absence.

The use of a single fluid lithographic ink, e.g., an emulsion of lithographic inks in water, in lithographic printing processes is desirable but difficult to realize. In order to be useful, a single fluid lithographic ink must be formulated so that the hydrophilic phase separates out of the ink to maintain clean non-image areas, regardless of the degree of ink coverage area, while at the same time having sufficient stability to prevent the two phases from separating at any time prior to reaching the printing plate. Excessive stability imparts flow problems and hinders the release of the water phase to the plate. Acceptable emulsions, in order to have the desirable rheological and stability properties requires a balance of interfacial chemistry, but the volume of water which should be used (typically about 35-50% by volume) are beyond the interfacial capacities of traditional lithographic inks. Emulsion inks based on combining a dampening solution with a lithographic ink have been generally unsuitable because of the variable stability characteristics of such inks.

The claimed invention is based on the discovery that a ink composition comprising: (a) glycerol; (b) a nonionic surfactant having a hydrophilic/lipophilic balance of about 8 to about 20; and (c) water in an amount of about 20 to about 50 percent by weight based on the total weight of the composition, could be used as a self-dampening single fluid lithographic ink.

The Rejection Of Claims 1-5, 10 And 12-18
Under 35 U.S.C. § 102 Over Krishnan Is Not Tenable

The Krishnan reference is similar to the claims on appeal in that it broadly involves a method of lithographic printing using a water based printing ink without the need to use an accompanying aqueous fountain solution. However, it deals with offset lithographic printing where the hydrophobic/hydrophilic characteristics of the image/nonimage areas of the printing plate are the opposite of that of the printing

plates in the present invention. The Krishnan ink contains 20-60% water, 10-70% binder, 2-30% pigment and 0.5-10% rewetting agent.

Thus, the Krishnan ink is designed to be employed in connection with a "waterless" offset type printing plate, i.e., one in which the image area is hydrophilic (column 1, lines 3-7) whereas the ink of the present invention is designed to be used with a different type of lithographic plate, one in which the image area is hydrophobic.

Turning to the composition of the ink, one of the differences in the ink used in the claimed method and Krishnan concerns the glycerol. Krishnan requires a rewetting agent (since the image area is hydrophilic) and teaches at column 4, lines 10-12, that any one of seven rewetting agents can be used. One of these rewetting agents is glycerol. Accordingly, a skilled person must made a selection among those 7 entities in order to select glycerol. There is nothing in the reference which indicates that glycerol should be selected in preference to any of the other entities, and indeed, glycerol is not employed in the working example.

A second difference concerns surfactants. The ink used in the claimed method contains a nonionic surfactant having a hydrophilic/lipophilic balance of about 8 to about 20, whereas use of a surfactant in Krishnan is optional, albeit preferred. Accordingly, the skilled person must choose whether or not to use a surfactant at all. If it is decided to use a surfactant, it is reasonable to choose a nonionic surfactant, as suggested in the reference, but then the person skilled in the art is faced with making a further selection among all of the available nonionic surfactants. There is nothing in the reference to guide the artisan to select a nonionic which has an HLB falling within the scope of the instant claims rather than a nonionic having a different HLB. Indeed, Krishnan does not even indicate that the HLB of the surfactant has any significant

whatsoever, as apparent from the fact that it does not even mention, even in passing, the fact that surfactants have HLB values.

In order to realize an ink as set forth in the claims on appeal, the artisan must made a number of individual selections. Since selections must be made and there is no disclosure of a species in the reference which meets all of the claim recitations, a Section 102 rejection is untenable. A Section 103 rejection would also not be tenable since not only is there no guidance in Krishnan for making those selections, but the type of lithographic printing plate for which the ink is being designed is the exact opposite of that for which the ink of the claims is designed.

In an effort to narrow the differences between the reference and the instant claims, the Examiner observed that the language "having a hydrophilic/lipophilic balance of" refers to a functional property of a surfactant. That, of course, is true but at the same time, this observation seeks to avoid rather than address the difference between Krishnan and the appealed claims. Those claims state that the HLB must fall within a range of 8-20; the fact that a surfactant has an HLB does not imply the HLB is in that range as opposed to, say 1-5 or 25-30.

The Examiner appear to be asserting that the required HLB value is present due to inherency. This is not permissible because it does not meet the legal requirements for reliance on inherency. More particularly, it is not proper to rely on inherency unless the inherency is certain; possibilities are not enough. Ex parte Robertson, 49 USPQ2d 1449 (Fed. Cir. 1999), Ex parte Cyba, 155 USPQ 756 (BPAI 1966). The fact that other members of the same class of surfactants listed by Krishnan have an HLB outside of the claimed range is established by the promotional material from Oilchem, Inc., of record, which shows that sorbitan esters had HLBs which can be as low as 1.8 and the material from Air Products, also of record, which shows nonionic

alkoxylated acetylenic based surfactants can have HLBs less than 8 (Appendix B). Thus, Applicants have made of record factual material which shows that nonionic surfactants could have an HLB as low as 1.8 and that means a value of 8-20 is not a necessary inherent characteristic of nonionic surfactants. Before it is proper to rely on a characteristic being inherent, the inherency must be mandatory and the factual showing that nonionic surfactants can have HLBs as low as 1.8 establishes that the HLB characteristic of 8-20 is not mandatory.

In an attempt to sidestep the deficiency in the inherency assertion, the Examiner has said that HLBs of less than 8 or more that 20 are not being relied upon, but that is a concession that an HLB of 8-20 is not necessarily inherent, and also confirms that a selection has been made in furtherance of the rejection.

In another attempt to bolster the rejection, the Examiner has drawn attention to Krishnan Example 1. But that Example 1 discloses a composition which does not contain glycerol in that Example and uses a surfactant which is only specified as an ethoxylated acetylenic diol surfactant of unspecified HLB. As noted, applicants have made of record material from Air Products which shows that nonionic ethoxylated acetylenic based surfactants can have HLBs of less than 8 and therefore, it cannot be assumed that the surfactant of Krishnan Example 1 satisfies the requirements of the instant claims. In yet another attempt to ignore the dictates of Section 103, the Examiner has observed that Krishnan is owned by the assignee of the present application and should know the HLB used by Krishnan. Under Section 103, however, is whether the claimed invention is obvious over what has been disclosed to those skilled in the art and what has been disclosed is that which appears in the printed text of the Krishnan reference. Moreover, applicants did establish that the surfactant of

Krishnan Example 1 had an HLB of less than about 8 in the parent application also on appeal but the Examiner gave no weight to that fact.

To arrive at the claimed invention basis on Krishnan, an artisan must make several simultaneous selections from a reference which concerns an ink for a different type of printing plate. There is nothing in Krishnan which teaches or motivates one skilled in the art to select glycerol as a rewetting agent and at the same time, select a non-ionic surfactant having an HLB of 8-20. The reference does not even indicate that the HLB of the surfactant has any significance whatsoever, as apparent from the fact that it does not even mention, even in passing, the fact that surfactants have HLB values. Motivation is required to avoid the "subtle but powerful attraction of a hindsight-based obviousness analysis," In re Dembiczak, 175 F.3d 994, 1000 (Fed. Cir. 1999); In re Kotzab, 55 USPQ2d 1313 (Fed. Cir. 2000). In the absence of any motivation or teaching to make all of the required selections, the possibility of making all of the required correct selections so as to fall within the scope of the instant claims is about the same as discerning the combination of a safe from a mere inspection of its dial. In re Luvisi, 144 USPQ 646 (CCPA 1965). That is insufficient under Section 103.

The rejection based on Krishnan is based on a hindsight reconstruction of the claimed invention, using the instant disclosure as a template. In the absence of that template and the use of hindsight, the rejection is untenable and should be reversed.

The 35 U.S.C. §103 Rejection Of Claims 6-9 And 11 Over Krishnan In View Of Best And Wasilewski Should Be Reversed

The essential difference between appealed claims 6-8 and 11 and the claims discussed above is the presence of mineral oil in the composition. Claim 9 further specifies particular nonionic surfactants having a HLB of 8-20, and therefore stands or

falls with the decision on the prior rejection. Accordingly, the remainder of this section concerns only claims 6-8 and 11.

The Board is advised that a rejection based on the same combination of references was made in the parent case to the composition, also on appeal.

Krishnan has been discussed above and the additional references do not cure the basic deficiencies in that reference vis-à-vis claims 6-8 and 11.

The Wasilewski reference shows the existence of a nonionic surfactant which is a alkylphenol ethoxylate. But other evidence of record, namely the Air Products material in Appendix B, shows that alkylphenol ethoxylate nonionic surfactants can also have HLBs well below 8. Wasilewski, therefore, simply indicates that surfactants having the claim designated HLB exist. Wasilewski teaches that tall oil fatty acid soap is essential in order to use water itself (as opposed to an aqueous composition) as a fountain solution and thus does not relate to a self-dampening composition. There is nothing in this reference which would guide one skilled in the art to select any particular surfactant and use it in the absence of the tall oil fatty acid soap in order to realize a composition which is self-dampening.

Further, it is respectfully submitted that Wasilewski contraindicate the claimed invention by teaching the use of certain surfactants in an ink which is not self-dampening, a teaching which would likely lead one skilled in the art to select some other type of surfactant when trying to design a self-dampening composition.

Best has been cited to show the use of mineral oil, a disclosure which is also found in Wasilewski. This reliance does not address the deficiencies in the combination of Krishnan and Wasilewski discussed above and therefore cannot serve to render the claims obvious. Best also suffers from the same deficiency as Wasilewski in that there

is no teaching nor suggestion that mineral oil can be a component of a self-dampening lithographic ink. There is, accordingly, no reason or motivation to combine these references to realize a composition which can be used in a method of lithographic printing using a self-dampening ink.

Best has been cited to show the use of mineral oil in a water-in-oil ink emulsion but it fails to have any teaching or suggestion that mineral oil can be a component of a self-dampening lithographic ink. There is, accordingly, no reason or motivation to combine these references. This was previously pointed out and the Examiner has replied that it constitutes argument and that the ink composition is already shown in the a primary reference Krishnan. However, in order to combine references, it is required as a matter of law that there be a teaching of that combination or there be motivation to make that combination. The burden on identifying such teaching or motivation is initially on the Examiner and that burden has not been met. Oil based printing inks (of which Best is one) require a dampening process using a fountain solution, i.e. they are not self-dampening. The question is, therefore, what would motivate one skilled in the art to selecting a particular ingredient from a composition which is not self-dampening and add it to a different composition with any expectation that the resulting composition would be self-dampening? The answer here is "nothing." It is respectfully submitted that until this question can be answered in the positive, a combination of the references is nothing more, and nothing less, than a hindsight reconstruction. The "rigorous ... requirement for a showing of the teaching or motivation to combine prior art references", Dembiczak, supra, has not been satisfied.

The §103 Rejection Of Claims 6-9 and 11 Based On Krishnan

In View Of Wasilewski Is Also Untenable

The combination of Krishnan, Best and Wasilewski has been shown to be insufficient in the preceding section. Elimination of Best from the rejection does not make the rejection more viable and if anything, weakens it.

VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A.

IX. EVIDENCE

Evidence of record relied upon by the Appellant is in an Appendix B.

X. RELATED PROCEEDINGS

A related proceedings Appendix C is included.

Dated: November 3, 2006

Respectfully submitted,

By Edward A. Meilman

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APPENDIX A

Claims Involved in the Appeal of Application Serial No. 10/617,495

1. A method for lithographic printing comprising using a self-dampening lithographic ink composition comprising a glycerol; a nonionic surfactant having a hydrophilic/lipophilic balance of about 8 to about 20; and about 20 to about 50% by weight based on the total weight of the printing ink composition of water.

2. The method of claim 1 wherein the self-dampening printing ink composition comprises glycerol in an amount of greater than 0% up to about 10 percent by weight; a nonionic surfactant having a hydrophilic/lipophilic balance of about 8 to about 20 in an amount of about 0.25 percent by weight to about 2 percent by weight; and water in an amount of about 20 to about 50 percent by weight; wherein the weight percentages are based on the total weight of the printing ink composition.

3. The method of claim 1 wherein the self-dampening printing ink composition comprises the glycerol in an amount of greater than 0% up to about 6 percent by weight; the nonionic surfactant in an amount of about 0.5 percent by weight to about 1.5 percent by weight; and the water in an amount of about 35 to about 50 percent by weight.

4. The method of claim 3 wherein the self-dampening printing ink composition comprises the glycerol in an amount of greater than 0% up to about 3 percent by weight.

5. The method of claim 4 wherein the self-dampening printing ink composition comprises the glycerol in an amount of about 2 percent by weight.

6. The method of claim 1 wherein the self-dampening printing ink composition comprises glycerol in an amount of greater than 0% up to about 10 percent by weight; a nonionic surfactant having a hydrophilic/lipophilic balance of about 8 to about 20 in an amount of about 0.25 percent by weight to about 2 percent by weight; water in an amount of about 20 to about 50 percent by weight; mineral oil in an amount of about 10 percent by weight to about 90 percent by weight; and colorant in an amount of about 1 percent by weight to about 30 percent by weight; wherein the weight percentages are based on the total weight of the printing ink composition.

7. The method of claim 6 wherein the self-dampening printing ink composition comprises glycerol the in an amount of greater than 0% up to about 6 percent by weight; the nonionic surfactant in an amount of about 0.5 percent by weight to about 1.5 percent by weight; the water in an amount of about 35 to about 50 percent by weight; the mineral oil in an amount of about 20 percent by weight to about 50

percent by weight; and the colorant in an amount of about 1 percent by weight to about 20 percent by weight.

8. The method of claim 7 wherein the self-dampening printing ink composition comprises glycerol the in an amount of about 2 percent by weight; the mineral oil in an amount of about 40 percent by weight; and the colorant in an amount of about 5 percent by weight to about 15 percent by weight.

9. The method of claim 1 wherein the nonionic surfactant is at least one member selected from the group consisting of silicone surfactant, alkyl phenol and polyethylene oxide derivative thereof, alkyl amine and polyethylene oxide derivative thereof, fatty acid amide and polyethylene oxide derivative thereof, block copolymer of propylene oxide and ethylene oxide, fatty acid ester, polyglycoside, polypropylene glycol, oil and fat.

10. The method of claim 1 wherein the self-dampening printing ink composition comprises binder resin.

11. The method of claim 1 wherein the self-dampening printing ink composition comprises glycerol the in an amount of greater than 0% up to about 3 percent by weight; a nonionic surfactant which is alkyl phenol polyethylene oxide or polyglycoside and is in an amount of about 0.5 percent by weight to about 1.5 percent

by weight; water in an amount of about 35 to about 50 percent by weight; mineral oil in an amount of about 20 percent by weight to about 50 percent by weight; colorant in an amount of about 1 percent by weight to about 20 percent by weight, and binder resin in an amount of about 1 percent by weight to about 50 percent by weight.

12. The method of claim 1 wherein the colorant is carbon black in an amount of about 5 percent by weight to about 15 percent by weight, and the binder resin in an amount of about 2 percent by weight to about 10 percent by weight.

13. The method of claim 11 conducting in the absence of a dampening composition other than said self-dampening composition.

14. The method of claim 7 conducting in the absence of a dampening composition other than said self-dampening composition.

15. The method of claim 6 conducting in the absence of a dampening composition other than said self-dampening composition.

16. The method of claim 3 conducting in the absence of a dampening composition other than said self-dampening composition.

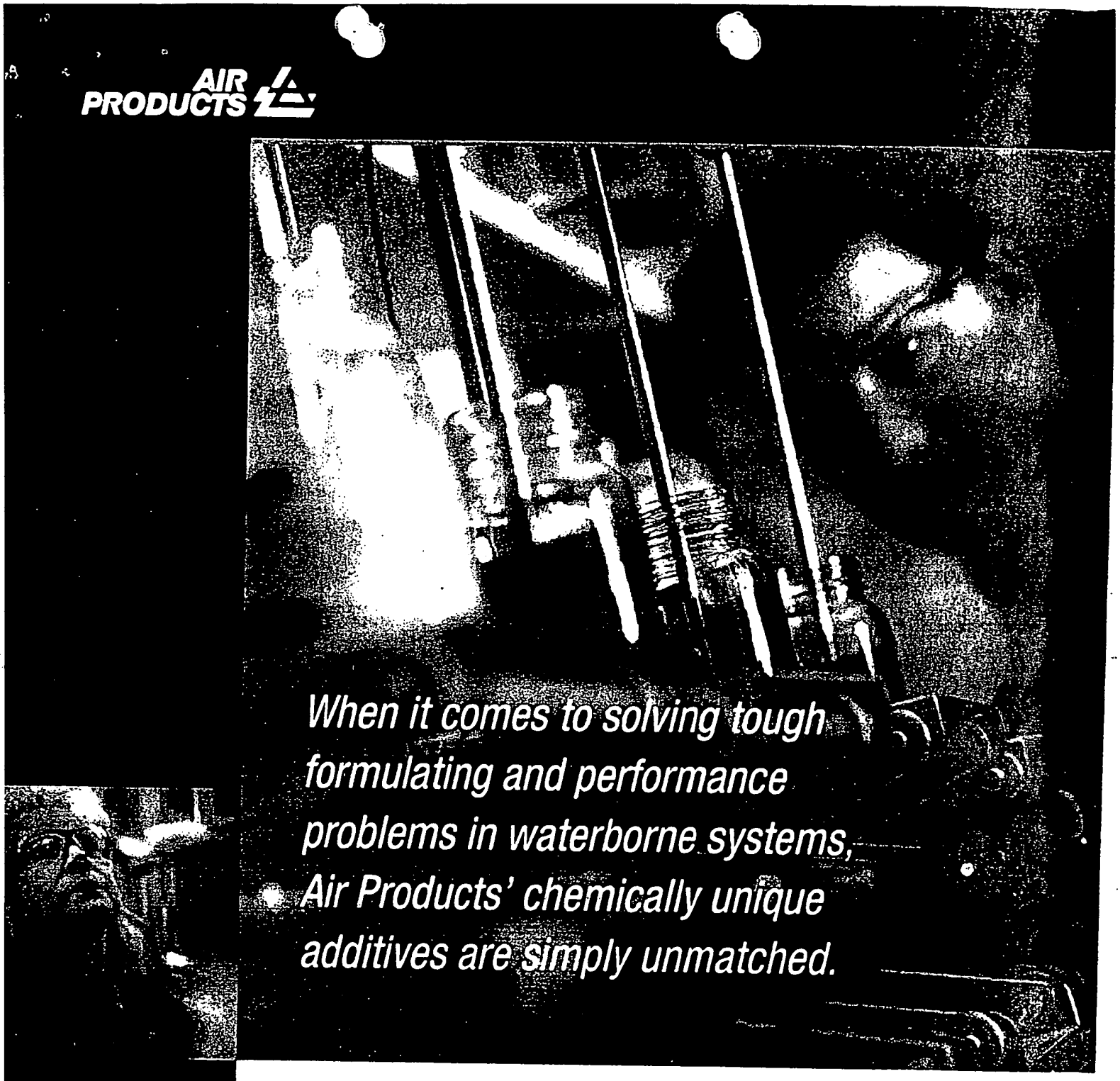
17. The method of claim 2 conducting in the absence of a dampening composition other than said self-dampening composition.

18. The method of claim 1 conducting in the absence of a dampening composition other than said self-dampening composition.

APPENDIX B

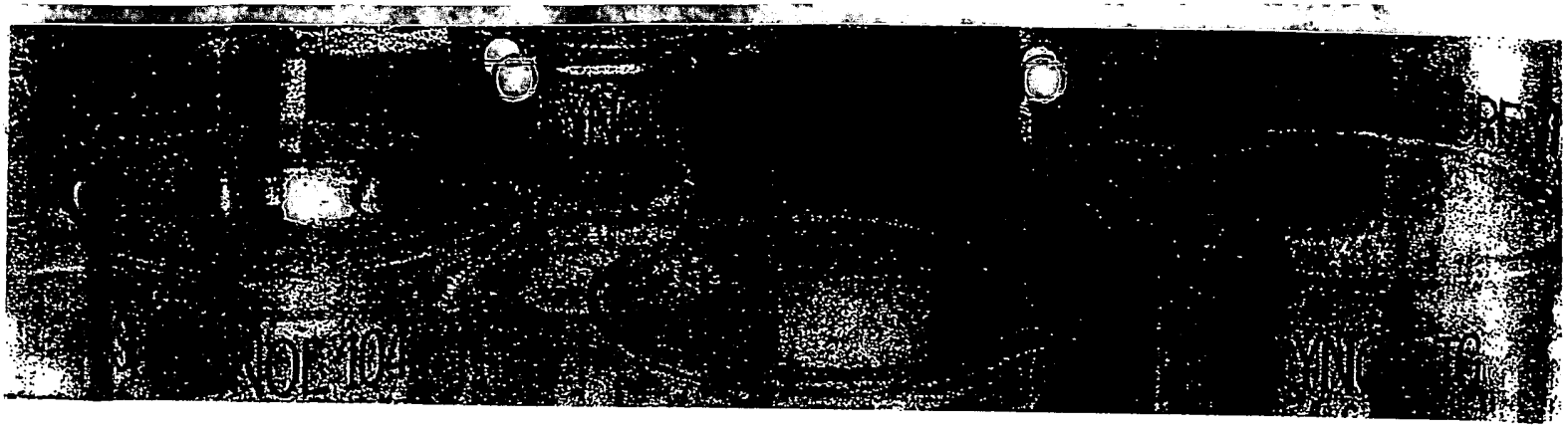
Commercial literature relating to surfactants and HLB from Air Products and OilChem.

AIR PRODUCTS



Surfynol®, Dynol™, and EnviroGem® Additives

reference guide



Surfynol Surfactants

Surfynol 104 Surfactant
Surfynol 104A Surfactant
Surfynol 104BC Surfactant
Surfynol 104DPM Surfactant
Surfynol 104E Surfactant
Surfynol 104H Surfactant
Surfynol 104PA Surfactant
Surfynol 104PG-50 Surfactant
Surfynol 104S Surfactant
Surfynol 2502 Surfactant
Surfynol 420 Surfactant
Surfynol 440 Surfactant
Surfynol 465 Surfactant
Surfynol 485 Surfactant
Surfynol 485W Surfactant
Surfynol 502 Surfactant
Surfynol 504 Surfactant
Surfynol 61 Surfactant
Surfynol FS-80 Surfactant
Surfynol FS-85 Surfactant
Surfynol OP-340 Surfactant
Surfynol PSA-204 Surfactant
Surfynol PSA-216 Surfactant
Surfynol PSA-336 Surfactant
Surfynol SE Surfactant
Surfynol SE-F Surfactant

EnviroGem Surfactants

EnviroGem AD01 Surfactant
EnviroGem AE01 Surfactant
EnviroGem AE02 Surfactant
EnviroGem AE03 Surfactant

Dynol High-Performance Surfactant

Dynol 604 Surfactant

Surfynol Antifoams/Defoamers

Acetylenic-Based

Surfynol DF-37 Defoamer
Surfynol DF-110D Defoamer
Surfynol DF-110L Defoamer
Surfynol MD-20 Defoamer
Surfynol PC Surfactant

Silicone-Based

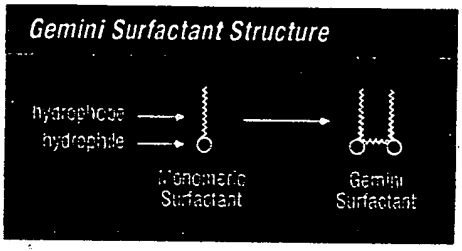
Surfynol DF-58 Defoamer
Surfynol DF-62 Defoamer
Surfynol DF-66 Defoamer
Surfynol DF-574 Defoamer
Surfynol DF-695 Defoamer

Organic-Based

Surfynol DF-70 Defoamer
Surfynol DF-75 Defoamer
Surfynol DF-210 Defoamer

Surfynol Pigment Dispersion Additives

Surfynol CT-111 Surfactant
Surfynol CT-121 Surfactant
Surfynol CT-131 Grind Aid
Surfynol CT-211 Surfactant
Surfynol CT-221 Surfactant
Surfynol CT-231 Surfactant
Surfynol CT-136 Grind Aid
Surfynol CT-141 Dispersant
Surfynol CT-151 Dispersant
Surfynol CT-171 Grind Aid
Surfynol CT-324 Grind Aid
Surfynol GA Surfactant
Surfynol TG Surfactant



For four decades Air Products has been developing specialty additives for waterborne systems based on our proprietary Gemini surfactant technologies. Because they contain two hydrophiles and at least two hydrophobes within a single molecule, Gemini surfactants are more surface-active than their single hydrophile/single hydrophobe analogs. As a result, our Gemini surfactants—Surfynol, Dynol, and EnviroGem additives—are highly efficient, multipurpose and can solve a variety of formulation problems as well as provide specific performance benefits in the systems that include them.

This brochure is intended to give an overview of our complete line of Surfynol, Dynol and EnviroGem additives. Some of these products may not be commercially available in all regions. Please check with your local Air Products office. Additionally, not all of these products are stocked in all regions, so lead time for product delivery may vary.

Surfynol Surfactants

Surfynol 104 Surfactant[1]

Wetting Agent and Defoamer: A nonionic surfactant that has multifunctional benefits, including wetting and foam control, in aqueous systems. Due to its hydrophobic nature, the product has reduced water sensitivity when compared to conventional surfactants.

Surfynol 104
100% waxy solid

Surfynol 104A
50% Surfynol 104 and
50% 2-Ethylhexanol

Surfynol 104BC
50% Surfynol 104 and
50% 2-Butoxyethanol

Surfynol 104DPM
50% Surfynol 104 and
50% Dipropylene Glycol
Monomethyl Ether

Surfynol 104E
50% Surfynol 104 and
50% Ethylene Glycol

Surfynol 104H
75% Surfynol 104 and
25% Ethylene Glycol

Surfynol 104PA
50% Surfynol 104 and
50% Isopropyl Alcohol

Surfynol 104PG-50
50% Surfynol 104 and
50% Propylene Glycol

Surfynol 104S
46% Surfynol 104 and
54% Amorphous Silica

- Solubility: (0.1%) in water at 25 °C
- HLB = 4

Surfynol 2502

Antifoaming Wetting Agent: Surfynol 2502 represents the first in a series of ethoxylated/propoxylated acetylenic-based surfactants that are different from the traditional Surfynol and Dynol products. It offers low dynamic surface tension levels, low pseudo-equilibrium surface tension, excellent foam destabilization, and is extremely low-VOC (1.2%). It is also easy to incorporate and is stable in hard water.

- Surfynol 2502 is a 100% active liquid
- HLB = 7.8

Surfynol 420[1]

Wetting Agent and Defoamer: A nonionic surfactant that functions both as a wetting agent and foam control agent.

- Solubility: 0.1% in water at 25 °C (1.0 g/L)
- HLB = 4
- 1.3 moles EO on Surfynol 104

[1] For specific information on the use of our products in FDA-compliant systems, please visit our website at www.airproducts.com/surfynol.

Surfynol 440[1]

Nonfoaming Wetting Agent: A nonfoaming, nonionic surfactant that is employed for substrate wetting.

- Solubility: 0.15% in water at 25 °C (1.5 g/L)
- HLB = 8
- 3.5 moles EO on Surfynol 104

Surfynol 465[1]

Nonfoaming Wetting Agent: A nonionic, low-foaming surfactant that is utilized for its wetting and slight emulsification properties. Surfynol 465 has a high cloud point for utilization in high-temperature systems.

- Miscible in water
- HLB = 13
- 10 moles EO on Surfynol 104

Surfynol 485[1]

Wetting Agent: A nonionic surfactant that functions as a wetting agent. Surfynol 485 also has slight emulsification properties.

- Soluble in water
- HLB = 17
- 30 moles EO on Surfynol 104

Surfynol 485W[1]

Wetting Agent: A nonionic surfactant that functions as a wetting agent. The product also has slight emulsification properties. Surfynol 485W is an 85% solution of Surfynol 104 in water with lower viscosity and easier handling properties.

- Soluble in water
- HLB = 17
- 30 moles EO on Surfynol 104

Surfynol 502[1]

Nonfoaming Wetting Agent: An acetylenic diol-based, nonionic and anionic blend wetting agent designed to provide excellent, defect-free coverage over the most difficult-to-wet substrates in aqueous systems. In certain systems, Surfynol 502 acts as a moderate defoamer and flow/leveling agent. Primary applications are those over low-energy substrates such as plastics, metals, wood and previously coated materials.

- Surfynol 502 is a 78% active liquid

Surfynol 504[1]

Nonfoaming Wetting Agent: An acetylenic diol-based, nonionic and anionic blend wetting agent designed to provide excellent, defect-free coverage over the most difficult-to-wet substrates in aqueous systems. Primary applications are those over low-energy substrates such as plastics, metal, wood and previously coated materials.

- Surfynol 504 is an 80% active liquid

Surfynol 61

Wetting Agent and Defoamer: A volatile, nonionic surfactant that functions as a wetting agent and defoamer. The product evaporates at room temperature to reduce water sensitivity and other undesirable surfactant side effects. The product is also useful as an alcohol and glycol ether replacement.

- Product is a 100% active liquid
- Solubility: 0.9% in water at 20 °C (9.0 g/L)
- HLB = 5–6

Surfynol FS-80

Wetting Agent: A solvent-free, low-foaming wetting agent specifically designed for incorporation into lithographic fountain solutions. Based on acetylenic chemistry, this surfactant provides important wetting and emulsification properties in fountain solutions while eliminating the need for alcohols. Additionally, the product is environmentally friendly with ultra-low VOCs and low odor.

- Soluble in water

Surfynol FS-85

Wetting Agent: A solvent-free, low-foaming wetting agent specifically designed for incorporation into lithographic fountain solutions. Based on acetylenic chemistry, this surfactant provides important wetting and emulsification properties in fountain solutions while eliminating the need for alcohols. Additionally, the product is environmentally friendly with ultra-low VOCs and low odor.

- Soluble in water

Surfynol OP-340

Wetting Agent: A liquid product designed to be compatible and perform well with the various acrylic resins commercially utilized in aqueous overprint varnishes (OPV). The product was developed specifically to provide low surface tension and excellent substrate wetting at competitive formula costs for aqueous overprint varnishes over wet or dry lithographic inks.

- Slightly soluble in water

Surfynol PSA-204[1]

Low-Foaming Wetting Agent: A low-foam wetting agent based on proprietary acetylenic diol technology designed to solve formulating problems in water-based pressure-sensitive adhesive applications, especially in SBR latex adhesives. The product provides excellent wetting with minimal effect on final adhesive properties.

Surfynol PSA-216[1]

Wetting Agent and Defoamer: A defoaming wetting agent based on proprietary acetylenic diol technology designed to solve formulating problems in water-based pressure-sensitive adhesive applications, especially in both acrylic and vinyl acrylic adhesives. The product provides excellent wetting with minimal effect on final adhesive properties.

- Soluble in water

[1] For specific information on the use of our products in FDA-compliant systems, please visit our website at www.airproducts.com/surfynol.

Surfynol PSA-336[1]

Wetting Agent: A powerful solvent-free wetting agent with moderate foaming tendencies, based on proprietary acetylenic diol technology. The product offers the lowest dynamic surface tension and is designed to provide the appropriate balance between wetting agent and defoamer that is required for water-based pressure-sensitive and laminating adhesive applications, especially in gravure applications for labels.

- Moderately soluble in water

Surfynol SE

Wetting Agent and Defoamer: Surfynol SE is a nonionic defoaming surfactant which can act as a highly effective wetting agent, defoamer and viscosity stabilizer and often performs more than one of these functions in combination.

- Surfynol SE is an 80% active liquid
- Solubility: 0.14% in water at 25 °C (1.4 g/L)
- HLB = 4–5

Surfynol SE-F[1]

Wetting Agent and Defoamer: Surfynol SE-F is a nonionic self-emulsifiable surfactant that will reduce surface tension and control foam. This product's self-emulsifiable nature improves ease of addition into water-based systems.

- Surfynol SE-F is an 80% active liquid
- Solubility: 0.14% in water at 25 °C (1.4 g/L)
- HLB = 4–5

EnviroGem Surfactants

EnviroGem AD01

Defoaming Wetting Agent: A 100% active, liquid, low-odor, APE-free and HAPs-free nonionic surfactant. EnviroGem AD01 surfactant demonstrates fast knockdown defoaming, foam control and wetting in many applications.

- HLB = 4
- Chemical stability from pH 3–13

EnviroGem AE01

Low-Foam Wetting Agent: A 100% active, low-foam wetting agent that has shown superior flow and leveling properties in many waterborne systems. EnviroGem AE01 surfactant can be used to minimize defects caused by entrained air or poor wetting, such as orange peel, cratering, pigment settling and low gloss. EnviroGem AE01 surfactant is classified as readily biodegradable by both OECD 306 (marine) and OECD 301A-F (fresh water), which makes it ideal for environmentally sensitive applications.

- HLB = 5
- Solubility: 0.2 wt % in water at 25 °C (2.0 g/L)

EnviroGem AE02

Low-Foam Wetting Agent: A 100% active, low-foam wetting agent that has shown superior flow and leveling properties in many waterborne systems. EnviroGem AE02 surfactant can be used to minimize defects caused by entrained air or poor wetting, such as orange peel, cratering, pigment settling and low gloss. EnviroGem AE02 surfactant is classified as readily biodegradable by both OECD 306 (marine) and OECD 301A-F (fresh water), which makes it ideal for environmentally sensitive applications.

- HLB = 4
- Solubility: 0.05 wt % in water at 25 °C (0.5 g/L)

EnviroGem AE03

Low-foam Wetting Agent: A 100% active, low-foam wetting agent that has shown superior flow and leveling properties in many waterborne systems. EnviroGem AE03 surfactant can be used to minimize defects caused by entrained air or poor wetting, such as orange peel, cratering, pigment settling and low gloss. EnviroGem AE03 surfactant is classified as readily biodegradable by both OECD 306 (marine) and OECD 301A-F (fresh water), which makes it ideal for environmentally sensitive applications.

- HLB = 4
- Solubility: 0.05 wt % in water at 25 °C (0.5 g/L)

Dynol High-Performance Surfactant

Dynol 604

Ultra Wetting Agent: A low-VOC, low-foam, nonionic wetting agent ideal for high-performance waterborne applications. The product offers an excellent balance of properties, generally not found in fluoro or silicone surfactants, making it an alternative for difficult-to-wet-substrates requiring good flow and leveling. This wetting agent has the ability to reduce both equilibrium and dynamic surface tension to a degree not found with other surfactants.

- Dynol 604 is a 100% active liquid
- Equilibrium surface tension: 26 dynes/cm in water at 0.05% (0.5 g/L)
- Dynamic surface tension: 28 dynes/cm in water
- Solubility: <0.1% in water at 25 °C (1.0 g/L)

Surfynol Antifoams/Defoamers

Acetylenic-Based

Surfynol DF-37[1]

Defoamer: A nonionic, acetylenic-based defoamer which promotes foam control as well as surface wetting. This product was developed for use during latex glove and waterborne coating dipping applications to eliminate web formation while minimizing surface defects. Other applications include inks, adhesives and paints.

- Emulsifiable in water

Surfynol DF-110D and DF-110L

Defoamer: A nonionic, nonsilicone acetylenic-based product useful for defoaming in aqueous systems without the side effects typical of many foam control agents. The product is also a deairentrainment agent in aqueous high-solids systems.

Surfynol DF-110D and DF-110L are liquid products solubilized in low-molecular-weight glycols.

- Solubility: 0.03% in water at 25 °C (0.3 g/L)
- HLB = 3

[1] For specific information on the use of our products in FDA-compliant systems, please visit our website at www.airproducts.com/surfynol.

Surfynol MD-20[2]

Molecular Defoamer: A 100% active, nonsilicone, liquid product based on Gemini surfactant technology. This is a unique multifunctional defoamer, providing a combination of foam control and dynamic wetting, offering formulators the potential to reduce overall additive levels while further reducing surface defects. Used alone or in combination with other Surfynol wetting agents, Surfynol MD-20 is exceptionally effective at eliminating microfoam and other foam-related defects.

Surfynol PC

Defoamer: A nonsilicone defoamer and pigment shock reducer for paper coating formulations. Surfynol PC is extremely stable, retaining its defoaming activity even during recycling of the formulation. Surfynol PC defoamer may also be used in pigmented systems, such as paints, and in systems where foaming influence is a water-soluble polymer.

Silicone-Based

Surfynol DF-58

Defoamer: Surfynol DF-58 is a silicone-based foam control agent useful in aqueous systems, especially in industrial maintenance coatings and wood coatings. The product has strong foam control and deairation performance. In addition, the product has been modified to prevent surface defects caused by many conventional defoamers.

- Surfynol DF-58 is a 100% active liquid
- Emulsifiable in water

Surfynol DF-62

Defoamer: An ether-modified polysiloxane-based defoamer. The product is designed to provide excellent knockdown defoaming and sustained antifoaming over time. Appropriate applications include waterborne wood coatings, industrial maintenance coatings, printing inks and pigment grind applications.

- Surfynol DF-62 is a 100% active liquid
- Emulsifiable in water

Surfynol DF-66

Defoamer: An acetylenic-modified, polysiloxane-based emulsion defoamer. The product is designed for use in aqueous ink systems. It is recommended for use in pigment grinding and letdown applications. Surfynol DF-66 defoamer provides an excellent balance of initial knockdown and sustained defoaming with no detrimental effects on printability in a water-based ink system.

- Surfynol DF-66 is a 46% active liquid
- Emulsifiable in water

Surfynol DF-574

Defoamer: A self-emulsifying product formulated with organic and organo-modified silicone components. The product was designed as a rapid knockdown defoamer for use in aqueous coatings and inks. Surfynol DF-574 defoamer can provide effective removal of entrained air and foam generated during the manufacture of water-based coatings and inks.

- Emulsifiable in water

Surfynol DF-695[1]

Defoamer: A silicone emulsion defoamer designed for water-based coatings and inks. The product is effective in both the grind step and letdown. It is particularly useful in acrylic-resinated systems.

- Emulsifiable in water

Organic-Based

Surfynol DF-70[1]

Defoamer: An organic-based defoamer designed specifically for water-based formulations. The product is an effective knockdown and sustained antifoamer. It is particularly suited for use in acrylic and styrene-acrylic systems.

- Product is a 100% active liquid and should be mixed prior to use
- Dispersible in water

Surfynol DF-75[1]

Defoamer: An oil-free, nonsilicone defoamer designed for aqueous systems. The product is an effective knockdown and sustained defoamer. It is particularly beneficial in acrylic-resinated systems.

- Product is a 100% active liquid
- Emulsifiable in water

Surfynol DF-210

Defoamer: A nonsilicone defoamer developed for aqueous coatings and inks. It is especially useful in systems to be applied over absorbent substrates. The product is useful in the letdown for long-term foam control.

- Dispersible in water

Surfynol Pigment Dispersion Additives

Surfynol CT-111

Pigment Grind Aid and Wetting Agent: A low-foaming, solvent-free, nonionic additive designed as both a substrate wetting agent and as a grind aid for low-HLB pigments. As a pigment grind aid, Surfynol CT-111 should be used in conjunction with an anionic dispersant or grind resin. As a substrate wetting agent, the product improves coverage and flow properties.

- Solubility: 0.5% in water at 25 °C (5 g/L)
- HLB = 8–11

Surfynol CT-121

Pigment Grind Aid: A low-foaming, solvent-free, nonionic grind aid specifically designed for wetting organic pigments of mid-range HLB values. Surfynol CT-121 promotes maximum color strength while reducing the required grind time. The product should be used in conjunction with an anionic dispersant or grind resin.

- Miscible in water
- HLB = 11–15

[1] For specific information on the use of our products in FDA-compliant systems, please visit our website at www.airproducts.com/surfynol.
[2] Commercial quantities of this material are expected in the summer of 2003. Please contact your local Air Products representative for more information.

Surfynol CT-131

Pigment Grind Aid and Dispersant: A solvent-free, nonionic/anionic grind aid designed for aqueous pigment wetting and dispersion. Surfynol CT-131 is recommended for high-HLB organic pigments and all inorganic pigments. The product is also useful in dispersions of the universal type. Surfynol CT-131 can be utilized in conjunction with a grind resin or for "resin-free" grinding.

- Miscible in water
- HLB = 11–20

Surfynol CT-211

Pigment Grind Aid and Wetting Agent: A nonionic additive designed for both pigment and hydrophobic substrate wetting. It is both solvent-free and APE-free. As a pigment grind aid, it is suitable for use with hydrophobic pigments, due to its relatively low HLB value (8–11). As a wetting agent, it finds use in water-based coatings, inks, adhesives and many other systems. Use levels will be between 0.1% and 3.0% on total formulation for wetting applications and between 3% and 15% on dry pigment weight, depending on the pigment used. It is commonly formulated in combination with anionic surfactants, such as Surfynol CT-141 or water-soluble grind resins.

- HLB = 8–11

Surfynol CT-221

Pigment Grind Aid: A nonionic grind aid, specifically designed for pigment wetting and stabilization. It is both solvent-free and APE-free and is suitable for use with pigments that have mid-range HLB (11–15) values. Surfynol CT-221 provides low viscosity at high pigment loadings and excellent dispersion stability in resin-free and resin-containing grinds. Use levels will be between 3% and 15% on dry pigment weight, depending on pigment used.

- HLB = 11–5

Surfynol CT-231

Pigment Grind Aid and Dispersant: A solvent-free and APE-free, nonionic/anionic grind aid. It is designed for aqueous pigment wetting and dispersion. Surfynol CT-231 is suitable for use with pigments with a wide-range of HLB values (8–20) for formulating resin-free grinds. Surfynol CT-231 provides low viscosity at high pigment loadings and excellent dispersion stability. Use levels will be between 3% and 15% on dry pigment weight, depending on the pigment used. It is commonly formulated in combination with anionic surfactants, such as Surfynol CT-141, or hydrophilic high-density pigments, such as iron oxides or titanium oxides.

- HLB = 8–12

Surfynol CT-136

Pigment Grind Aid and Dispersant: A highly formulated product to aid in low-foam grinding, dispersion and viscosity control of pigments in aqueous media. The product is also recommended for grinding and dispersing universal tint bases, regardless of pigment type. Surfynol CT-136 can be employed with resin or in resin-free grinds. The grind aid is suitable with high-HLB organic and all inorganic pigments.

- Miscible in water
- HLB = 11+

Surfynol CT-141

Dispersant: Low-molecular-weight dispersant designed to aid in aqueous pigment dispersion or to control viscosity in a finished system. The product is anionic for highly efficient charged stabilization. This product is commonly used as a post-add in waterborne inks.

- Soluble in water

Surfynol CT-151

Dispersant: A highly efficient anionic pigment dispersant that, when included in waterborne industrial coatings and inks, leads to reduced grind viscosity and particle size. Surfynol CT-151 dispersant has no deleterious effect on gloss or corrosion resistance and provides excellent viscosity/dispersion stability and low process/application foam.

- Soluble in water

Surfynol CT-171

Pigment Grind Aid and Dispersant: A solvent-free anionic/nonionic grind aid designed to provide both effective pigment wetting and dispersing characteristics for many types of organic pigments. The product provides long-term dispersion and finished ink viscosity stability, especially in troublesome pigments such as lithol rubine. Surfynol CT-171 is effective for both resin and resin-free dispersions.

- Soluble in water

Surfynol CT-324

Pigment Grind Aid and Dispersant: A formulated additive designed to facilitate the dispersion of titanium dioxide and other inorganic pigments. The product can give high-solids dispersion at optimal viscosities, with low foam. The product can be used alone or with other dispersants.

- Miscible in water
- HLB = 13+

Surfynol GA

Pigment Grind Aid: A blend of nonionic surfactants designed as a grinding aid for organic pigments of mid-HLB range. Surfynol GA rapidly wets out the pigment and controls mill-base foam and viscosity. The product is used in conjunction with anionic dispersants and grind resins.

- Miscible in water
- HLB = 13+

Surfynol TG

Pigment Grind Aid and Wetting Agent: A low-foaming nonionic surfactant blend useful for substrate wetting and as a grind aid in low-HLB pigment dispersion. As a pigment grind aid, Surfynol TG is used and is compatible with anionic surfactants or grind resins. The product will also prevent water spotting in water rinses. Surfynol TG shows excellent curtain stability in curtain coating applications.

- Solubility: 0.5% in water at 25 °C (5.0 g/L)
- HLB = 9–10

AIR PRODUCTS

For Samples or More Information

If you would like additional information or technical assistance in preparing specific formulations, write or call Air Products and Chemicals, Inc. at the following locations.

North America

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PERSONAL CARE

Personal Care | Nonionic Surfactants

1:1 Diethanolamides

Amide:85%	Coconut
: Liquid	

Applications: Economical foam boosters and viscosifier. Used in shampoos, bubble baths, liquid hand and boc and household and institutional cleaners.

1:1 Diethanolamides

Amide:95%	Coconut
: Liquid	

Applications: High performance cosmetic grade amides. Exceptional viscosity builders in high foaming shampc products.

1:1 Diethanolamides

Amide:85%	Linoleic
: Liquid	

Applications: Superfatting agent. Extremely effective thickener for low active shampoo, bubble bath and hand : conditioning properties to hair and skin products.

1:1 Diethanolamides

Amide:95%	Lauric
: liquid	

Applications: Outstanding foam boosting and stabilization. Greatly enhances viscosity and performance in han shampoos and related cosmetics.

1:1 Monoethanolamides

Amide:88%- 96%	Coconut
: Flakes	

Applications: Adds opacity, thickening, foam boosting, foam stabilization and mildness. Used in solid detergen controlled release cleaners.

1:1 Monoethanolamides

Amide:95%	Lauric
: Flakes	

Applications: Useful in foaming bath powders.

1:1 Monoethanolamides

Amide:95%	Stearic
: Flakes	

Applications: High melting point. Very mild. Binder and conditioner for syndet and combo bar soaps. Stabilizes institutional laundry powder to high use temperatures.

2:1 Alkanolamides

Amide:72%	Coconut
: Liquid	

Applications: Versatile foam booster, stabilizer and viscosifier for shampoos, bubble baths, powdered and liqui

Aromatic Ethoxylates

5.0	<20
HLB: 10.0	

Applications: Anti-icing additive for gasoline. Solubilizer/dispersant for hair colorants. Used in every type of de phases of aqueous textile, pulp and paper processing. Also for industrial metal cleaners, floor cleaners and sa emulsifier for nonpolar solvent emulsion cleaners, detergents, floor cleaners and floor polishes.

Castor Oil Ethoxylates

Chemical/CTFA Name:PEG-15 Castor Oil	Molecular Weight:1600

EO Content,wt%: 41.3	HLB: 8.2
Hydroxyl Number: 105	Water Solubility: Insoluble
Applications: Emulsifier, viscosity control agent, dispersant, lubricant, solubilizing agent, emollient.	

Castor Oil Ethoxylates

Chemical/CTFA Name:PEG-20 Castor Oil	Molecular Weight:1820
EO Content,wt%: 48.4	HLB: 9.7
Hydroxyl Number: 92	Water Solubility: Insoluble
Applications: Emulsifier, wetting agent, dispersant, lubricant, solubilizing agent, metal processing.	

Castor Oil Ethoxylates

Chemical/CTFA Name:PEG-30 Castor Oil	Molecular Weight:2260
EO Content,wt%: 58.4	HLB: 11.7
Hydroxyl Number: 74.5	Water Solubility: Insoluble
Applications: Emulsifier, softener, dispersant, lubricant, solubilizing agent and rewetting agent.	

Castor Oil Ethoxylates

Chemical/CTFA Name:PEG-25 Castor Oil	Molecular Weight:2040
EO Content,wt%: 53.9	HLB: 10.7
Hydroxyl Number: 82.5	Water Solubility: Insoluble
Applications: Emulsifier, softener, dispersant, lubricant, solubilizing agent and rewetting agent.	

Castor Oil Ethoxylates

Chemical/CTFA Name:PEG-60 Castor Oil	Molecular Weight:3580
EO Content,wt%: 73.7	HLB: 14.7
Hydroxyl Number: 47	Water Solubility: Soluble
Applications: Emulsifier, emollient, dispersant, antistat, lubricant, solubilizing agent, superfatting agent and sof	

Nonionics with Ester Groups

Flakes	60-67 C
HLB: 1.4	Chemical/CTFA Name: Glycol Distearate (I
Applications: Opacifier and pearlizing agent in personal care and detergent systems.	

Nonionics with Ester Groups

Flakes	57-61C
HLB: 2.7	Chemical/CTFA Name: Glycerol Stearate (
Applications: Pearlizing agents in shampoos, liquid hand and body soaps, and liquid detergents. Emulsion stal	

Nonionics with Ester Groups

Flakes	58-63C
HLB: 4.5	Chemical/CTFA Name: Glycerol Stearate
Applications: Lipophilic emulsifier for creams, lotions, sunscreens and antiperspirants. Opacifies and thickens.	

Nonylphenol Ethoxylate

1.5	<20
HLB: 4.6	
Applications: Extremely oil soluble surfactant and intermediate. Stabilizes foam at low levels and defoams at h emulsifier in surfactant concentrates. Emulsion stabilizer. Oil soluble detergent and dispersant for petroleum oi	

Nonylphenol Ethoxylate

6	<20
HLB: 10.8	
Applications: Borderline oil and water solubility. Intermediate to anionic surfactants. Emulsifiers and coupling a emulsifier for mineral oil, silicones and agricultural compounds.	

Nonylphenol Ethoxylate

4	<20
HLB: 8.8	
Applications: Plasticizer and antistat for PVAc. Freeze-thaw stabilizer for latices. Oil soluble detergent/dispers	

Nonylphenol Ethoxylate

30	74-78 1% in 10% NaCl
HLB: 17.2	
Applications: Used in high temperature scouring of textiles. Solubilizer for toxaphene, kerosene and essential	

Peg Esters, Ethoxylated Acids and Oils

Liquid	HLB:7.2

Chemical/CTFA Name: PEG-8 Dioleate	
Applications: Oil soluble emulsifier for defoamers and fiber finishes. Adds lubricity. Co-emulsifiers and opacifie	

Peq Esters, Ethoxylated Acids and Oils

Liquid	HLB:11.0
Chemical/CTFA Name: PEG-8 Oleate	
Applications: Emulsifier for fats. Useful in straight oils and soluble oils.	

Peq Esters, Ethoxylated Acids and Oils

Liquid	HLB:10.0
Chemical/CTFA Name: PEG-12 Dioleate	
Applications: Emulsifier/solubilizer for oils, fats and solvents in metal working fluids, textile lubricants and pesti	

Peq Esters, Ethoxylated Acids and Oils

Viscous Liquid	HLB:12.0
Chemical/CTFA Name: PEG- 30 Castor Oil	
Applications: Emulsifier for fats, oils, fatty acids, waxes and solvents. Dispersant for pigments and iron powder fluids. Paper dye-leveling agent. Softening and rewetting agent for wet strength paper. Stabilizer for PVAc em degreasers and fat liquoring. Maintains viscosity of water-emulsion paints over wide temperature range. Emuls binders. Co-emulsifier for fabric softners and dye carriers.	

Peq Esters, Ethoxylated Acids and Oils

Solid	HLB:13.6
Chemical/CTFA Name: PEG-40 Castor Oil	
Applications: Used to emulsify vitamins and other pharmaceuticals. Other uses similar to PEG-30 Castor Oil.	

Peq Esters, Ethoxylated Acids and Oils

Liquid	HLB:18.3
Chemical/CTFA Name: PEG-200 Castor Oil	
Applications: Effective emulsifier for mineral oil, triglycerides and alkyl esters. Textile antistat, lubricant and dye	

Sorbitol Esters and Ethoxylated Sorbitol Esters

Liquid	HLB:16.7
Chemical/CTFA Name: Poly Sorbate 20	
Applications: Emulsifiers/solubilizes vitamin oils, essential oils, balsam, fragrances and tars in cosmetics and p as a thickener for shampoos and nylon spin finishes. Emulsifier for dye carriers.	

Sorbitol Esters and Ethoxylated Sorbitol Esters

Liquid	HLB:18.3
Chemical/CTFA Name: PEG-80 Sorbitan Laurate	
Applications: Reduces irritancy of baby shampoos and children's bath care products.	

Sorbitol Esters and Ethoxylated Sorbitol Esters

Liquid	HLB:15.0
Chemical/CTFA Name: Polysorbate 80	
Applications: Emulsifies fatty alcohols in tobacco sucker control agents. Versatile O/W emulsifier. Co-emulsifie for petroleum oils, fats, solvents and waxes.	

Sorbitol Esters and Ethoxylated Sorbitol Esters

Liquid	HLB:11.0
Chemical/CTFA Name: Polysorbate 85	
Applications: Emulsifier/co-emulsifier for oils, fats and waxes. For textile, leather , fiberglass, metal lubricants a	

Sorbitol Esters and Ethoxylated Sorbitol Esters

Liquid	HLB:8.6
Chemical/CTFA Name: Sorbitan Monolaurate	
Applications: Water dispersible emulsifier for oils and fats in cosmetics and industrial products. Also used as lu for PVC.	

Sorbitol Esters and Ethoxylated Sorbitol Esters

Liquid	HLB:4.3
Chemical/CTFA Name: Sorbitan Monooleate	
Applications: Versatile oil soluble emulsifier/coupler for medicines, oils, fats, and waxes in cosmetic, textile and Pigment dispersant in lipsstick, eyeliners, mascaras, etc. Used in oil-based ointments, creams and lotions to in reduce greasiness.	

Sorbitol Esters and Ethoxylated Sorbitol Esters

Solid Beads	HLB:4.7
Chemical/CTFA Name: Sorbitan Monostearate	

Applications: Water/oil emulsifier used in creams, lotions and mkeup preparations. Also serves as a textile lubr	
Sorbitol Esters and Ethoxylated Sorbitol Esters	
Liquid	HLB:1.8
Chemical/CTFA Name: Sorbitan Trioleate	
Applications: Used to formulate textile and leather softeners. Coupler and co-emulsifier for mineral oil.	

50 Industrial Circle, Lincoln, RI USA 02865, 401-722-2410

APPENDIX C

There is no decision by a Court or the Board in the identified related proceeding.